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ABSTRACT

This document contains four papers from a symposium on transfer of learning. "The Effect of a Mastery Practice Design on Learning and Transfer in Behavior Modeling Training of Supervisory Listening Skills" (Gary L. May) reports on a case-control study that drew from research in the cognitive sciences on complex skill acquisition to create a mastery practice design for interpersonal skills training. "Training Transfer as It Relates to the Instructional System and the Broader Work Environment" (Constantine Kontoghiorghes) presents an exploratory study in which the following variables were identified as being among the most important factors in facilitating transfer of training: measurement of trainee knowledge before and immediately after training; supervisory support and encouragement for application of new skills and knowledge; and intrinsic rewards. A study indicating the feasibility of implementing a high-performance, learning-oriented approach to organizing and managing in the low-wage service sector is discussed in "The Organizational Context of Learning and Performance in Four Retail Food Markets" (Martha A. Gephart). "Development and Validation of a Generalized Learning Transfer Climate Questionnaire: Final Report" (Elwood F. Holton III, Wendy E.A. Ruona, Michael Leimbach) describes a process of construct validation of an expanded learning transfer climate instrument through common factor analysis. (MN)

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17 Transfer of Learning

Chair: Allan Church, W. W. Burke & Association

The Effect of a Mastery Practice Design on Learning and Transfer in Behavior Modeling Training of Supervisory Listening Skills

Gary L. May, Millbrook Distribution Services

Training Transfer as it Relates to the Instructional System and the Broader Work Environment

Constantine Kontoghiorghes, Oakland University

The Organizational Context of Learning and Performance in Four Retail Food Markets

Martha A. Gephart, Columbia University

Development and Validation of a Generalized Learning Transfer Climate Questionnaire: Final Report

Elwood F. Holton III, Louisiana State University
Reid A. Bates, Louisiana State University
Wendy E. A. Ruona, University of Minnesota
Michael Leimbach, Wilson Learning Corporation

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The Effect of a Mastery Practice Design on Learning and Transfer in Behavior Modeling Training of Supervisory Listening Skills

Gary L. May
Millbrook Distribution Services

This study drew from research in the cognitive sciences on complex skill acquisition to create a mastery practice design for interpersonal skills training. Comparison to conventional behavior modeling workshop practice using a pretest-posttest control group design indicated improvements in retention and behavioral demonstration measures but failed to document any effect on transfer.

Transfer of training, defined as the application of newly acquired skills on the job, is a critical issue for HRD professionals (Baldwin & Ford, 1988; Broad & Newstrom, 1992). Enormous investments in training are believed to be largely wasted because of inadequate transfer, especially in the "soft skills" area of management development such as interpersonal communication and negotiation skills training. For example, Dixon (1990), after examining three decades of evaluation studies on management development programs, concluded that the programs appeared to have little lasting impact.

The broad questions that researchers are trying to answer are: "What factors most influence learning and transfer and how can we manage these factors to improve transfer of training?" Baldwin and Ford (1988), in their review of the transfer literature, proposed a conceptual framework for the study of training transfer. According to their model, transfer is a function of trainee characteristics, the degree of learning, and the work environment. The degree of learning, in turn, is a function of trainee characteristics, training design, and work environment. This study focused on the training design component and a sub-factor of Baldwin and Ford's model related to learning principles and conditions of practice. The purpose of the study is to explore the research question: "What is the effect of a mastery practice design on learning and transfer in behavior modeling training of supervisory listening skills?"

Theoretical Framework

Behavior modeling is currently the primary training design for delivery of supervisory interpersonal skills training in business today (Byham & Pescuric, 1996). Behavior modeling training was introduced in the early 1970's and based on Bandura's social learning theory (Bandura, 1977; Decker & Nathan, 1985; Goldstein & Sorcher, 1974). A number of research studies have demonstrated that behavior modeling training can be an effective training method in terms of reactions, knowledge gains, behavioral changes on the job, and business impact (for the latest review, see Russ-Eft, 1997).

Bandura's theory identifies four major sub-processes that govern observational learning: attention, retention, motor reproduction, and motivation. In behavior modeling designs, the retention and motor reproduction sub-processes are addressed through behavioral rehearsal and feedback in the form of practice using structured role-plays. Practice with feedback has been called "the crux" of behavior modeling training (Pescuric & Byham, 1996, p. 29) and there have been a number of articles in the popular literature emphasizing the importance of practice (e.g., Georges, 1996; Mills & Pace, 1988; Yelon & Berge, 1992). However, as noted by Salas, Cannon-Bowers, and Kozlowski (1997), there appears to be little empirical research on the mechanisms and principles of skill practice in relation to learning and transfer in a field environment. This is especially true for the more complex interpersonal skills that include significant cognitive components such as active listening.

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Traditional principles for conditions of practice, such as massed or distributed training, whole or part training, feedback, and overlearning, have been derived primarily from research on simple verbal- or motor-skills training (Adams, 1987; Baldwin & Ford, 1988). Within the behavior modeling research paradigm, there have been studies that have validated the importance of the rehearsal and feedback components (e.g., Fyffe & Tian, 1979; Stone & Vance, 1976). But there appears to be only two studies that have actually manipulated components of the practice and feedback process for interpersonal skills training (Decker, 1983; Mills & Pace, 1989). Decker (1983) studied the effects of rehearsal group size and video feedback on verbal and behavioral reproduction of skills for doing on-the-job training. He found that behaviorally rehearsing in small groups (with one or two observers as opposed to the entire training group) and providing immediate videotape feedback resulted in the highest reproduction scores. Mills and Pace (1989) examined the effects of various combinations of practice and feedback on cognitive recall and demonstration of listening skills immediately after training, two days later, and two weeks later. The combination of both practice and video feedback produced the greatest effect on the long-term performance scores. Of particular interest in this study was the decay in both recall and performance after just two weeks, leading to a call by the authors for overlearning through additional practice and feedback to fortify performance levels. This highlights a particular problem with interpersonal skills training: participants come to the training with behavioral habits firmly established. While modeling may indeed result in the learning of new behaviors, old ways of acting tend to re-assert themselves back in the workplace (Goldstein & Sorcher, 1974).

Though well designed, both the Decker and Mills and Pace studies have limitations due to their sample (college population) and failure to examine the effect of the training manipulations on actual transfer. What is needed is an "industrial strength" practice and feedback training design to help deal with these tough transfer issues in actual business environments. One possible approach to the problem may be to extend the theoretical framework that guides behavioral modeling practice to include the latest research on complex skill acquisition from cognitive and educational psychology as summarized by Anderson (1995; 1996). According to Anderson, skill learning occurs in three stages: (a) a cognitive stage, in which a description of the procedure is learned (declarative knowledge); (b) an associative stage, in which a method for performing the skill is worked out (procedural knowledge); and (c) an autonomous stage, in which the skill becomes more and more rapid and automatic (skill acquisition). It is this third stage which is crucial for competent performance (Shiffrin & Schneider, 1977), where component skills become compiled and automated so that conscious process capacity can be devoted to the more demanding aspects of complex tasks. Goldstein (1993) describes such automaticity as a "crucial point in instructional theory" (p. 110). Unfortunately, there's only one way that automaticity is developed – through extensive, guided practice (Anderson, 1995). Thus, one reason behavior modeling training fails to transfer may be because the typical practice design takes the trainee only through the second stage of Anderson's model. Trainees only practice a few rounds, just enough to become familiar with the prescribed behaviors. They learn the steps but fail to build genuine skill because trainers underestimate the true complexity of interpersonal skills such as active listening (Mills & Pace, 1989). For example, a typical learning point in active listening skills is to "establish and maintain rapport." To accomplish this, trainees have to simultaneously attend to the message at three levels: verbal, vocal, and visual. In addition, they must use a variety of key behaviors, such as remaining neutral, using "door openers," reflecting back words and feelings, and matching or pacing the sender's delivery. This is a "high load" cognitive task. It's very difficult for most people to both think about what they are supposed to be doing and execute the behaviors in a comfortable, fluid manner without extensive practice. As noted by Georges (1996), we typically produce graduates who are able to perform only crude, forced imitations of the skill. People don't like to look clumsy and artificial to their bosses, peers, or subordinates. Therefore, the new "skills" learned in class soon vanish from lack of use.

Mastery Practice Design and Hypotheses

Instructional principles drawn from Anderson's work (Glaser, 1990) include (a) extensive targeted practice beyond the point of mastery, (b) a tutor's close control of the learning process, (c)

immediate feedback, and (d) a gradual approximation of expert behavior by accumulation of components of the skill. Based on these principles, a special "mastery practice" protocol was developed by the researcher for empirical evaluation. The protocol contained the following components: (a) mastery (continued drill to 100% criterion against a behavioral checklist), (b) overlearning (to a minimum 50% level), (c) one-on-one expert coaching, and (d) video feedback. The procedure used a learning lab format where participants in the test group met individually with the researcher for a 90 minute session in a small room equipped with a table, chairs, and video equipment.

On the basis of the foregoing discussion, this study tested the following hypotheses: trainees participating in the mastery practice design, when compared to trainees participating in the traditional workshop practice design, will have (a) higher cognitive retention of the listening model, (b) better performance on behavioral demonstrations through role-play, and (c) greater transfer of behavior as measured by perceptions of coworkers.

Method

Sample Participants in the study were 42 first line supervisors and managers at a consumer product manufacturing plant located near Atlanta, Georgia. The initial group represented the entire supervisory population in the production area of the plant. Four participants missed various portions of the training and were deleted from the database. The remaining 38 participants were well-educated (average 15 years of schooling), experienced in supervision (average 6.4 years in supervisory positions), and responsible for an unusually large number of direct reports (average 28.5).

Training Program The training program focused on active listening skills. The program used a classic behavior modeling design (Decker & Nathan, 1985) and consisted of six hours of instruction. Developed internally by the researcher's instructional design staff, the program was a fourth-generation design and had been successfully delivered to more than 300 supervisors and managers over a six-year period in various divisions of a national distribution firm. The program taught specific behaviors related to four key skill sets: *act like a listener, maintain rapport, ask open-ended questions, and check for understanding.* Workshop content and activities were adapted to the manufacturing environment and role model videos were shot at the plant using plant personnel as models. Role-play situations used throughout the training were tailored to plant specific situations and averaged 6 to 8 minutes in length. The plant was scheduled to change to a self-directed work team production process in 1998. The effective listening program was considered a valuable supplement to other training designed to support the supervisors during the transition to self-directed teams. Three executive directors of manufacturing and the vice president of manufacturing participated fully in all phases of the training, including the data collection, to demonstrate support for the intervention.

Procedure The study employed a pretest-posttest control group design. Prior to training, each participant completed a role-play that was videotaped to provide a baseline on listening skills behavior. In addition, an anonymous and confidential 360-degree survey on workplace listening practices was completed by up to six associates for each participant.

All participants then attended a four-hour listening skill workshop using standard behavioral modeling protocol. This included presentation and discussion of each skill set, viewing of role model videos, cognitive rehearsal of the key behaviors, and part-task practice of each skill set in triads using behavioral checklists. At the conclusion of the basic workshop, participants were tested for immediate recall of the listening skill model. During a break, trainees were paired on the basis of boss, department, gender, and years of experience as a supervisor and randomly assigned from each matched pair (Fleiss, 1981) to one of two conditions: conventional workshop practice (control group) and mastery lab practice (test group). Trainees assigned to the control condition returned to the workshop, formed new role-play triads, and participated in whole-task practice of the full listening model for 90 minutes.

The following week, each trainee assigned to the test condition participated in one-on-one role-play practice with the researcher for a 90-minute period using the mastery lab protocol. The practice process began with a viewing of the participant's pre-training role-play against the same

10-item behavioral checklist used in the whole-task practice segment of the workshop. The participant and the researcher, serving as coach, shared and discussed the ratings and the participant selected one or two of the behaviors to focus on for the next round of role-play practice. The role play situation was then repeated, videotaped, and analyzed using the same behavioral checklist and discussion procedure. With each successive round of role-play, the participant was encouraged to take more responsibility for the analysis and to continue incorporating additional behaviors as targets for focused practice. This scaffolding process (Palincsar & Brown, 1984) continued until the participant and researcher could agree that all 10 behaviors on the checklist had been adequately demonstrated in one role-play. This constituted the mastery criterion. After mastery was obtained, additional practice rounds were conducted as time permitted. The average participant reached mastery in two rounds and continued for one additional round for 50% overlearning.

Four weeks following the training for each group, cognitive retention of the listening skills model was assessed, new role plays were video-taped to assess behavioral proficiency, and the listening practices survey was repeated to assess behavior change in the workplace. At the conclusion of the study, semi-structured interviews were conducted with 36 of the 38 participants to obtain qualitative data on the dynamics of the learning and transfer process related to the two training conditions. In addition, the mastery lab experience was made available to all participants in the control group.

Measures Learning was assessed according to the 3-level framework suggested by Alliger, Tannenbaum, Bennett, Traver, and Shotland (1997): immediate knowledge, knowledge retention, and behavior/skill demonstration. Immediate knowledge was used as a covariate for the knowledge retention measure. Transfer of training was evaluated with a 360-degree survey instrument.

Immediate post-training knowledge This first level measure was administered upon conclusion of the basic workshop to assess immediate recall. Participants were asked to fill in a blank version of the listening skills model taught in the course. This required participants to list from memory the four major learning points of the program and the key behaviors associated with each learning point. Five points were assigned to each major learning point and one point to each behavior for a total of 41 possible points.

Knowledge retention The same fill-in-the-blank instrument was used to assess retention four weeks after training. Participants were not informed of this procedure in advance. Both measures of declarative knowledge, immediate recall and retention were scored independently by two graders blind to training condition, followed by a joint discussion to achieve consensus on a single score. Interrater agreement prior to discussion on this measure was .99.

Behavior/skill demonstration To assess proficiency in use of the listening skills, the pre- and post-training videotaped role-plays were rated by two trained raters using a criterion referenced behavioral checklist (Blank, 1982). Raters were blind to condition. Each behavior on the checklist was worded so it could be observed and checked yes or no. Ten key behaviors were listed with provisions for one additional check on four of the more complex behaviors, resulting in a maximum score of 14 checks. Videos were rated independently, followed by a joint discussion to achieve consensus on a single score. Observer agreement prior to discussion on this measure was .87.

Transfer Listening skills transfer was assessed by use of the Listening Practices Feedback Report (LPFR) developed by Brandt Management Associates. The LPFR measures 28 listening behaviors using a 5-point Likert scale with ratings from 1 ("rarely if at all") to 5 ("almost all the time"). It has been found to be a sufficiently valid and reliable measure of listening in the workplace (Emmert, Emmert, & Brandt, 1994). Example statements from the questionnaire include (a) "gives the speaker full attention and is not preoccupied with other concerns, (b) "during meetings and conversations, permits the speaker to continue without interruptions" and (c) "responds or paraphrases comments to insure understanding." In addition to the self-rating, copies of the LPFR were distributed on a confidential basis to the participant's boss, two peers, and three subordinates. The average number returned per participant for the pre-training and post-training surveys was 5.7 and 5.1, respectively.

Results

The correlation matrix of the dependent post-training measures is presented in Table 1. Significant correlation was observed between the knowledge retention and behavioral demonstration measures. There was no correlation between either retention or behavioral demonstration and the transfer measure.

Table 1: Intercorrelations for Dependent Measures

Measure	Retention	Demonstration
Retention		
Demonstration	.34*	
Transfer	-.09	.01

N = 38 (post-training); * $p < .05$

A one-way analysis of covariance was conducted on each dependent measure to determine whether the post-training results for the two groups differed after adjustments were made for pre-training differences. The assumption of equal regression slopes was tested for each measure and found tenable. With three planned comparisons, alpha level was set at .10 and controlled through the *Bonferroni inequality* (Stevens, 1990) to reduce the chance of a Type I error. Dividing the overall alpha by the number of tests (.10/3) resulted in each comparison being tested at the .033 level. On this basis, the ANCOVA indicated that the mean retention scores for the mastery practice group were significantly higher than retention scores for the conventional practice group, $F_{(.033,\ 1,\ 35)} = 6.06$, $p = .019$. Furthermore, the mean behavioral demonstration scores for the mastery practice group were significantly higher than the demonstration scores for the conventional practice group, $F_{(.033,\ 1,\ 35)} = 5.39$, $p = .026$. There was no significant difference between groups on the transfer measure. Table 2 presents the means, standard deviations, and adjusted means for all measures by group. Table 3, on the following page, presents the analysis of covariance summary.

Table 2. Means and Standard Deviations for Dependent Measures by Group

Measure	Pre-Training		Post-Training		
			Obtained		Adjusted
Group	M	SD	M	SD	M
Retention					
Mastery	28.95	8.85	27.37	8.56	26.26
Conventional	24.79	8.33	16.95	12.73	18.05
Demonstration					
Mastery	4.26	1.37	8.42	1.07	8.47
Conventional	4.58	1.30	7.21	2.23	7.16
Transfer					
Mastery	3.89	.25	3.94	.31	3.94
Conventional	3.90	.27	3.95	.31	3.94

N = 38 (19 per group)

Discussion

The results indicate support for the hypotheses related to greater learning for the mastery practice group as measured by knowledge retention and behavioral demonstration. This is consistent with cognitive research on memory and learning that indicates both memory for material and speed of retrieval improves the more elaborately it is processed (Anderson, 1995). However, it should be noted that there was still significant room for improvement in both groups. On the cognitive recall test, the conventional workshop group achieved only 17 points or 42% of the maximum possible

score four weeks after the training. The mastery group did much better but still only scored at 69% of the total possible points. In a traditional academic classroom, the groups would be graded "F" and "D" respectively. These memory scores correlated with less than stellar behavioral demonstration scores. The optimum score on the behavioral checklist was 14 checks. After training, the conventional practice group averaged 7.2 checks, or 51% of potential. The mastery group averaged 8.4 checks, a significant difference, but still only 60% of potential. The problem with memory retrieval could be seen clearly during the post-training videos. As participants began the role-play, they were asked to simply use the behaviors learned in the training workshop. Many had quizzical looks on their faces as they struggled to remember what they were supposed to do just four weeks after the training. This points to a critical insight for HRD practitioners. One of the possible problems with transfer is that the workshop participants may not be really learning the material in the first place and more attention in training needs to be paid to the acquisition, retention, and retrieval of the learning points. It is difficult for someone to try to use the behaviors in the workplace if they don't remember what they are.

Table 3. Analysis of Covariance Summary for Dependent Measures

Source	DF	Sum of Squares	Mean Square	F Value	Sig. of F
Retention					
Group	1	603.20	603.20	6.06	.019
Pre Treatment	1	751.79	751.79		
Error	35	3,848.58	99.59		
Demonstration					
Group	1	15.98	15.98	5.39	.026
Pre Treatment	1	5.96	5.96		
Error	35	103.83	2.97		
Transfer					
Group	1	.00	.00	.00	.969
Pre-Treatment	1	1.74	1.74		
Error	35	1.68	.05		

In regard to the transfer measure, there was no significant difference between groups and no significant change from pre-training conditions. One explanation for this, of course, could be the inadequate learning and retention. However, based on the post-training interviews, two other factors may have contributed to the results. First was a methodological problem with the 360-degree survey. Each participant included on the distribution list their boss and two peers as well as three subordinates. Since all supervisors and managers in the production facility participated in the training, this meant that three of the six participants in the survey might have been affected by *response-shift bias* in the survey due to their participation in the training (Howard & Dailey, 1979). This is a phenomenon where people tend to rate differently (and usually more stringently) on a post-training survey after they have been exposed to the training. This viewpoint was collaborated without prompting by at least six of the participants. A second factor that may have influenced transfer results was the *opportunity to perform* (Ford, Quinones, Sego, & Sorra, 1992). It was assumed that the four-week period would give supervisors adequate time to demonstrate the new behaviors in the workplace. However, interviews with participants indicated that few actually had a chance to use the type of active listening process taught in the workshop with the survey participants. This was due in part to the unusually large number of direct reports each supervisor managed coupled with a number of organizational and production process changes that were taking place during the research period that put additional time stress on everyone in the organization.

Based on the findings, it is clear that the mastery practice concept needs further research. In particular, mechanisms must be developed to enhance the acquisition, retention, and retrieval processes for memory and investigations conducted on just *how much* practice is needed to turn this declarative knowledge into automated procedural knowledge. The actual measurement of

transfer in the workplace also continues to be a challenging problem. In regard to listening skills, use of a valid and reliable survey instrument such as the LPFR to measure perceptions of listening behaviors in the workplace still seems appropriate. But more attention needs to be paid to the survey methodology. Example enhancements might include: (a) increasing the number of survey participants that are not participating in the training (b) providing a briefing for respondents on how to complete the survey, and (c) allowing more time after training before administration.

Contributions to HRD Theory and Practice

Transfer of training is a complex and systemic issue with many variables (Ford & Associates, 1997). One role of theory in HRD is to discern priorities (Torraco, 1997). As we continue to develop improved theoretical evaluation and measurement models, training design has been identified as an important component (Baldwin & Ford, 1988; Ford & Weissbein, 1997; Holton, 1996). Yet, there are few definitive guidelines for what constitutes appropriate transfer designs (Holton, 1995). This paper has pointed to the need to link advances in the cognitive sciences on memory and skill acquisition with social learning theory to form a basis for developing improved practice designs within the behavior modeling context.

In regard to HRD practice, this study appears to be the first empirical study on the effect of mastery practice design in a field environment. An interview with Sue Borain, an associate with Zenger Miller, a leading supplier of training programs based on the behavior modeling training design, indicated that the degree of practice is an important practical issue (personal communication, April 28, 1997). According to Borain, clients, when pressed for time, invariably reduce the amount of time allotted for skill practice in the training design. In addition, as noted by Georges (1996), another critical issue is the quality of practice itself. Practice that takes place in a typical workshop may be poorly executed. Trainees thus leave the training without the mastery or confidence to perform effectively back on the job. This study has therefore contributed to HRD training practice by providing empirical data in a field setting on the importance of the degree and quality of practice to the learning and transfer process and suggesting some initial guidelines for the design of more powerful practice sessions. The conditions of practice for complex interpersonal skills in terms of length, distribution, and design should continue to be a pragmatic research concern for HRD professionals.

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Training Transfer as it Relates to the Instructional System and the Broader Work Environment

Constantine Kontoghiorghes
Oakland University

The purpose of this exploratory study was to identify the key factors within and outside the training context that could affect training transfer. Data analysis showed that the most important variables that can facilitate training transfer are: measurement of trainee knowledge before and immediately after training; supervisory support and encouragement for the application of new skills and knowledge; intrinsic rewards, such as praise and recognition; a participative/sociotechnical organization that is characterized by a high degree of employee involvement; and, a continuous learning environment that encourages frequent participation in multiskill training and retraining programs.

As it has recently been described by many researchers, research on training has in many respects been nontheoretical and nonempirical (Baldwin & Ford, 1988; Clark, Dobbins, & Ladd, 1993). In particular, Clark et al. (1993) stated:

> Unfortunately, research on training has generally been atheoretical and faddish. Researchers have frequently attempted to increase the effectiveness of training by focusing on training techniques. Special attention has also been paid to the arrangement of training environments. But without a theoretical basis for studying the techniques and training environments, researchers are often at a loss either to explain why they are effective or to predict their effectiveness in other settings or for other trainees. (p. 293)

The same sentiment expressed by Clark et al. (1993) was shared by Rouiller and Goldstein (1993), who stated that "in nearly all studies of training outcomes, the emphasis has been on identifying and examining the characteristics of training programs and individual learners and relating these factors to training and job performance" (p. 377). This approach, the authors continue, ignores the characteristics of the job situation and whether these characteristics influence the transfer of training behavior onto the job.

With regard to the problematic nature of training research, Tracey, Tannenbaum, and Kavanagh (1995) stated that "significantly less research has examined the transfer of trained skills to the job, and even fewer studies have examined how the work environment influences such transfer. From a theoretical standpoint, a more comprehensive conceptual framework of training effectiveness can be developed and tested by considering factors outside the training context" (p. 239). Tracey et al. (1995) also emphasized that despite the potential importance of the work environment, little research has been conducted to operationalize and empirically assess training-specific situational factors that either facilitate or impede the application of newly learned skills on the job.

Purpose of the Study

Given the problematic nature and limitations of research on training, the main purpose of this exploratory study was to bridge some of the above stated research gaps by identifying key factors within and outside the training context that could affect training transfer after the introduction of new technologies in the organization. In doing so, the main instructional systems design, transfer of training climate, and organizational variables that were perceived to affect training effectiveness were to be identified, and their relationship to training knowledge immediately after training as well as three to nine months later to be described.

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Since research in this area has been very limited, a secondary objective of this study was to develop a reliable and valid survey instrument with which all the relevant variables and constructs could be assessed. The theoretical framework upon which the instrument was developed were the instructional design, training transfer, and sociotechnical systems theories which in turn furnished the training and work environment variables projected to have an influence on trainee performance.

Training Transfer Variables In short, the following training transfer climate variables that were found by the Rouiller and Goldstein (1993) as well as the Tracey et al. (1995) studies to have a direct effect on post-training behaviors were incorporated in the survey instrument of the study:

1. The degree to which characteristics of a trainee's job prompted or reminded him or her to use new skills and knowledge acquired in training (task cues).
2. The degree to which trainees were openly discouraged from using new skills and knowledge acquired in training (punishment consequences).
3. The degree to which supervisors supported and encouraged the application of new skills and knowledge acquired in training (supervisory support for new skills).
4. The degree to which trainees received extrinsic rewards for using newly learned skills and knowledge acquired in training (extrinsic reinforcement consequences).
5. The degree to which trainees received intrinsic rewards for using newly learned skills and knowledge acquired in training (intrinsic reinforcement consequences).
6. The degree to which the users of the new technology functioned in a work environment which emphasized innovation and competition (innovative-competitive organization).
7. The degree to which the users of the new technology functioned in an environment in which supervisors and coworkers strongly encouraged the acquisition and use of any new relevant skills and behaviors (social support for new skills).

Organizational Moderator Variables The derivation of the following 10 questions that dealt with the work environment within which the training and new technology interventions were introduced, was based on Pasmore's (1988) STS assessment survey, the properties of motivating jobs as defined by Hackman and Oldham (1980), and the comprehensive seven year meta-analysis study by Macy and Izumi (1993) in which the d-effects of 60 sociotechnical action-levers on organizational outcomes were examined. The purpose of these questions was to determine the degree to which the new technology was introduced in an organization whose design was consistent with sociotechnical systems principles, which in turn "have been demonstrated to produce high levels of commitment and performance" (Pasmore, 1988, p. 157).

8. The degree to which the users of the new technology functioned in a very participative organization characterized by a high degree of employee involvement (Participative organization).
9. The degree to which the users of the new technology were members of self-directed teams (self-directed teams).
10. The degree to which the users of the new technology were intimately involved in communications and decisions regarding the design and development of the new technology (employee involvement).
11. The degree to which the users of the new technology functioned in a multiskill work environment characterized by a common job classification system (multiskill work environment).
12. The degree to which the users of the new technology worked in a flat and decentralized organization, composed of mini-enterprises functioning within the firm (flat organization).
13. The degree to which the users of the new technology frequently participated in multiskill training and retraining programs and were rewarded for doing so (multiskill training environment).
14. The degree to which the users of the new technology were involved in enriched jobs that required a variety and higher level skills which in turn took a long time to master (skill variety).
15. The degree to which the users of the new technology did a whole and complete piece of work and had the authority to make all important decisions about it throughout the process (task identity).
16. The degree to which in carrying out their work activities required by the job, the users of the new technology received clear information about the effectiveness of their performance from the job itself and their supervisors (job/supervisory feedback).

17. The degree to which the users of the new technology functioned in an environment in which a great deal of information about business was shared with employees (information sharing).

Research Questions

In short, this study attempted to answer the following research questions:

Research Question 1 If training is used during the introduction of the new technology in the organization, what is the degree of association between each of the following instructional system components and knowledge of training material immediately after training (posttest score) as well as three to nine months later (training retention score)?

1. Needs assessment (person analysis, task analysis, organizational analysis).
2. Goals and objectives.
3. Audience analysis.
4. Learning task analysis and/or procedural analysis.
5. Evaluation (Pre-test, trainee reactions, summative, impact).

Research Question 2 If training is used during the introduction of the new technology in the organization, which of the identified training transfer climate and organizational moderator variables facilitate or impede its effectiveness?

Methodology

Subjects The sampling frame of this study consisted of 4097 training, human resource, quality, and organization development professionals who were national members of the American Society of Training and Development (ASTD) and were listed under the Total Quality Management section of the 1995 directory. Out of these 4097 national members, 971 were randomly selected to participate in the study through the circular systematic sampling procedure.

Response rate. The overall response rate for this study was calculated at 33.26% (323/971). Of the 323 returned surveys, 59 belonged to participants who were unable to provide the necessary data and they were therefore returned blank. Furthermore, 29 of the mailed surveys were sent to addresses that were experiencing delivery problems and they were thus dropped from the sample. In all, 264 of the returned surveys (27.19%) had usable data upon which the statistical analysis of this study is based on.

Participants. The participants of this study consisted of training, human resource, organization development, and quality managers with an average age of 43.35 years (SD = 8.32). Fifty-eight percent of the respondents were male and each participant had held his or her present job for an average of 4.65 years (SD = 3.70). Collectively, 96.4% of the respondents had a college degree and represented 46 states. Furthermore, the respondents worked in all sectors of the industry with manufacturing (33.19%), health care (10.54%), and financial services (10.14%) being the majority. Finally, the participants of this study worked in organizations that on the average employed 7,595 employees (SD = 19,244).

New Technology. In terms of the new technology introduced in the organization, representing 77.2% of valid responses, information technology (i.e., a technology that stores, retrieves, analyzes, or transmits information) was overwhelmingly the type of technology most respondents (203/264) introduced in their organization during the last five years. On the other hand, computer-aided manufacturing technologies (such as robotics and computer-aided design and manufacturing), materials technologies (such as ceramics and nonmetallic composites), and biotechnologies (i.e., technologies that use living organisms to modify plants or animals) were introduced by only 10% of the respondents. The remaining 11.8% of participants introduced a variety of other technologies, such as new equipment or machinery, production systems, and process operations.

Instrument The instrument for this study consisted of a mail questionnaire which was custom-designed for the purposes of this study. The questionnaire was comprised of 39 questions and was pilot-tested on a group of 50 participants before the main study.

Method Once the pilot-study was conducted and appropriate changes to the instrument were made, the finalized survey questionnaire was sent to the randomly selected participants. A week after the first mailing a postcard reminder was mailed to all participants. Three weeks after the initial mailing, a second cover letter and a second questionnaire were sent to all non-respondents. The survey was closed three weeks later.

Data analysis After the data from the 264 participants was collected, both descriptive and inferential statistics were used to analyze it. With regard to research question 1, a correlational analysis indicated the degree of association between the instructional system components and knowledge of training material immediately after training as well as three to nine months later. A correlational analysis was also used to partly answer research question 2. Further, a multiple regression analysis was used to determine how the instructional system components in conjunction with the identified training transfer and organizational moderator variables and factors related to training retention three to nine months after training.

Stepwise regression was the selection method used when building the regression models for this study. The F-to-enter and F-to-remove values used were 0.05 and 0.01 respectively. In order to increase the reliability of the produced regression models, all outliers greater than three standard deviations were excluded from the analysis.

The reliability of the instrument was assessed via the calculation of coefficient alpha for all Likert scale items of the questionnaire. As in the case of reliability, all Likert scale items were also used to empirically construct validate the instrument through the use of a principal components analysis. For this study, the criterion used in order to determine how many components to retain was that of Kaiser (i.e., only components whose eigenvalues are greater than 1 are retained), which according to Stevens (1986) is one of the most accurate and widely used ones.

Results

Reliability and Construct Validity In terms of reliability, coefficient alpha for the Likert type items of the instrument was measured at 0.87. In terms of construct validity, the principal components analysis that used a varimax rotation produced a four-factor solution that accounted for 55.1% of the total variance. The sample size utilized for the principal components analysis was 242 for which the critical value for significant loadings was calculated at |0.33| (Stevens, 1986).

In short, the first rotated factor which accounted for 33.7% of the total variance had the highest factor loadings (fl) from the following eight variables: innovative-competitive organization (6; fl = 0.51); social support for new skills (7; fl=0.66); participative organization (8; fl=0.82); self-directed teams (9; fl=0.56); employee involvement (10; fl= 0.50); flat organization (12; fl=0.52); multiskill training environment (13; fl=0.62); and, information sharing (17; fl=0.79).

From the above variable descriptions, it becomes evident that the first rotated factor deals with the general organizational environment within which the new technology was introduced. Given that the variables that highly correlate with this factor are those that were incorporated in the questionnaire in order to determine the degree to which the new technology was introduced in an organization whose design was consisted with sociotechnical systems (STS) principles, this factor was interpreted as the "STS organization" factor.

The second rotated factor, which accounted for 8.2% of the total variance, highly correlated with the following variables: multiskill work environment (11; fl=0.70); skill variety (14; fl=0.68); task identity (15; 0.69); and, job/supervisory feedback (16; fl=0.44). In all, the second rotated factor was successful in grouping the variables that were incorporated in the instrument in order to describe the job dimensions of the work performed by the users of the new technology. This factor was defined as the "job design" factor.

The third factor of the varimax rotated factor matrix accounted for 7.1% of the total variance and drew the highest loadings from the following three variables: task cues (1; fl= 0.74); punishment consequences (2; fl=0.53); and, supervisory support for new skills (3; fl=0.64). Unlike the first two factors which dealt with the organizational and job environment in general, the third factor dealt with

the training transfer climate in which the application of new skills and knowledge took place. This factor was therefore interpreted as the "training transfer climate" factor.

The fourth and final rotated factor accounted for 6.1% of the total variance and had the highest loadings from the following two variables: extrinsic reinforcement consequences (4; fl=0.83); and intrinsic reinforcement consequences (5; fl=0.61). The last factor can thus be interpreted as the "rewards for new skills" factor.

In summary, the principal components analysis and varimax rotation produced a four factor solution which empirically construct validated the instrument. More specifically, the produced factors were successful in differentiating between the STS, job design, and training transfer climate variables. It is worth noticing that the innovative-competitive (6) and social support (7) variables which were described by Tracey et al. (1995) as "continuous -learning culture scales" were found to be more highly associated with the "STS organization" factor rather than the "training transfer climate" factor. This finding in essence validates the assertion expressed by Tracey et al. (1995) that a sociotechnical organization is conducive to a work environment that promotes a positive training climate and a positive learning culture.

Significant Correlations of Posttest and Training Retention Scores with Instructional System, Training Transfer, and Sociotechnical Variables and Factors A summary of all significant Pearson correlations of the posttest and training retention scores with the instructional system, training transfer, and sociotechnical variables as well as the four factors is depicted in Table 1. Based on results summarized in Table 1 one may conclude that there is not a high degree of association between knowledge of training material immediately after training (training posttest score) as well as three to nine months later (training retention score) with the identified instructional system components. More specifically, training knowledge immediately after training was found to be significantly correlated with only one of the non-evaluation ISD components, person analysis ($r = 0.215$, $p < 0.05$). Other variables that were found to be more strongly associated with knowledge of training material immediately after training were pretest administration ($r = 0.400$, $p < 0.01$), the pretest score ($r = 0.401$, $p < 0.01$), and summative evaluation ($r = 0.396$, $p < 0.01$).

In the aggregate then, training knowledge immediately after training was found to be more highly associated with the assessment of trainee knowledge before and immediately after training rather than the other identified ISD components. This can be considered as an important finding given that it statistically validates the importance of the training evaluation component as has been advocated by many human resource development theorists (Goldstein, 1986; Kirkpatrick 1987; Phillips, 1987).

With regard to retention of training material three to nine months after training, retention of training material was found to be highly correlated with the posttest score which in turn was obtained after the conduction of a summative evaluation ($r = 0.503$, $p < 0.01$). As far as the other ISD components are concerned, retention of training material was found to be significantly correlated with the development of goals and objectives ($r = 0.374$, $p < 0.05$) as well as the assessment of trainee reactions towards the training program ($r = 0.352$, $P < 0.05$). The significant association of retention of training and the latter two variables suggests two things: (a) that training transfer is facilitated further when the trainees have a clear understanding of what skills, behaviors, knowledge, or attitudes need to be acquired after attending training; and (b) training transfer will be facilitated further when the trainees feel that they are an integral part of the training program and that their reactions towards it are seriously taken into consideration.

In terms of the training transfer and sociotechnical variables, training knowledge immediately after training (posttest score) exhibited a significant correlation with four of the seventeen training transfer and organizational variables used in the questionnaire. All four significant correlations were in the 0.210 to 0.235 range. Unlike posttest score, retention of training material three to nine months after the completion of training was found to be significantly correlated with nine of the seventeen training transfer and organization variables. The significant correlations of training retention with the training transfer and moderator organizational variables ranged from 0.322 to 0.577. In terms of factors, although posttest was not found to be significantly correlated with any of them, retention of

training material significantly correlated with the training transfer climate ($\underline{r} = 0.614$, $\underline{P} < 0.01$) and sociotechnical organizational ($\underline{r} = 0.322$, $\underline{P} < 0.05$) ones.

Table 1

Summary of Significant Correlations for Training Posttest and Retention Scores[a]

		Training Posttest Score	Training Retention Score
Pearson Correlation	Posttest score	1.000	.503**
	Retention score	.503**	1.000
	Person analysis	.215*	.149
	Goals & objectives	.140	.374**
	G&O trng mngr involvement	.170	.428**
	Assessment of trainee reactions	.045	.352**
	Pretest administration	.400**	-.042
	Pretest score	.401**	.265
	Summative evaluation	.396**	.146
	Task cues	.139	.492**
	Supervisory support	.176	.577**
	Intrinsic reinforcement	.235*	.344*
	Social support for new skills	.108	.321*
	Participative organization	.215*	.505**
	Employee involvement	.210*	.433**
	Multiskill work environment	.002	.400*
	Flat organization	.080	.322*
	Multiskill training environment	.126	.237
	Job feedback	.210*	.287
	Information sharing	.084	.382*
	STS organization factor	.155	.322*
	Job design factor	.077	.255
	Training transfer climate factor	.164	.614**
	Rewards for new skills factor	.080	-.167

**. Correlation is significant at the 0.001 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

a. Underlined variables or factors reflect predictors selected by the corresponding regression model.

Stepwise Regression Model for Training Transfer Given the small number of respondents that provided data on the training retention variable (40/262), and that training retention was significantly correlated with two of the four factors, the regression model for training retention was built on the four factors as well as the four instructional system variables (goals & objectives- whether or not the training program involved the development of goals and objectives; goals & objectives trng mngr involvement - whether or not the training manager participated in the development of the goals and objectives of the training program; trainee reactions- whether or not the trainee reactions towards the training program were assessed; and, posttest score) which exhibited significant correlations with training retention. The results of the regression analysis are shown in Tables 2 and 3.

As it can be observed from Table 2, 56.2% of the variance of the training retention variable was accounted for by the training transfer climate factor and the posttest score variable. More specifically, the training transfer climate factor which has task cues (the degree to which the trainees

Table 2

Stepwise Regression Model for Training Retention[a,b]

Model	Variables Entered	Variables Removed	R	R^2	Adjusted R^2	Std. Error Of the Estimate
1	Training transfer climate factor	.	.631	.398	.381	15.15
2	Posttest score	.	.750	.562	.536	13.10

[a]. Dependent Variable: Retention Score; N = 37
[b]. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

Table 3

Beta Coefficients for Training Retention Regression Model

Model	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
(Constant)	46.774	8.777		5.329	.000		
Training transfer climate factor	10.936	2.231	.564	4.902	.000	.973	1.027
Posttest score	.411	.115	.411	3.572	.001	.973	1.027

job prompts him or her to use the new skills and knowledge acquired during training), supervisory support (the degree to which supervisors supported and encouraged the application of new skills and knowledge acquired in training), and reprimanded (the degree to which the newly trained employees were reprimanded for failing to use their training) as the predominant variables, accounted for 39.8% of the total variance of retention of training. The remaining 16.4% of the total variance was accounted for by the posttest score variable (the knowledge of training content by trainees immediately after training).

The standardized beta values for the training transfer climate factor and posttest score variable were 4.902 ($p = 0.001$) and 3.572 ($p = 0.001$) respectively (Table 3). According to the adjusted R^2 value (0.536) in Table 2, shrinkage for the regression model at 4.62% was very small. The tolerance value (the proportion of the predictor's variance not accounted for by the other independent variables in the regression equation) of 0.973 for both predictors (Table 3) indicates that the independent variables were highly uncorrelated. However, given the small sample size that was used for the derivation of this regression model, one should view the results with caution.

Conclusions

Based on the above stated findings, one may conclude that retention of training material, and hence the success of a training intervention, is not only dependent on how much training content the trainees have knowledge of immediately after training, but the training transfer climate as well as the broader organizational environment within which training is implemented. According to the presented data, the most influential variables for training transfer are: supervisory support (the degree to which trainees functioned in an environment in which supervisors supported and encouraged the application of new skills and knowledge acquired in training; $r = 0.577$, $p < 0.01$); participative organization (the

degree to which the trainees functioned in a very participative organization characterized by a high degree of employee involvement; $r = 0.505$, $p < 0.01$); task cues (the degree to which the characteristics of the trainee's job prompted or reminded her to use new skills and knowledge acquired in training; $r = 0.492$, $p < 0.01$); and, knowledge of training content immediately after training ($r = 0.503$, $p < 0.01$).

Another interesting conclusion that can be inferred from the data analysis is that extrinsic rewards, such as pay and promotions, as well as punishment for failing to use the new skills and knowledge, have very weak associations with knowledge of training content immediately after training ($r = -0.041$ and $r = 0.058$ respectively) or retention of training material three to nine months after training ($r = -0.079$ and $r = 0.052$ respectively). On the contrary, intrinsic rewards, such as praise and recognition for using the newly learned skills and knowledge acquired in training, proved to be a more valuable variable since it significantly correlated with both knowledge of training content immediately after training ($r = 0.235$, $p < 0.05$) and retention of training material three to nine months after the completion of training ($r = 0.344$, $p < 0.05$).

In short, what the findings of this study imply is that a training intervention would have a better chance of becoming successful when implemented in a participative organization where the employees not only are encouraged to learn and apply new skills and knowledge, but they are recognized for doing so. What can also be inferred from the findings of this study is that training effectiveness is not only dependent on the soundness of the training program and the prevailing training transfer climate, but the entire organization as a whole.

With regard to previous research, the results of this study tend to support those of Rouiller and Goldstein (1993) as well as those of Tracey et al. (1995) which in turn indicated that the training transfer climate and a continuous-learning culture have a direct impact on post-training behaviors. Further, like the findings of the Tracey et al. (1995) study, the results of this study are consistent with sociotechnical theory and also highlight the importance of social factors, such as supervisors and peers, when establishing supportive training and learning environments.

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The Organizational Context of Learning and Performance in Four Retail Food Markets

Martha A. Gephart
Columbia University

This paper reports the results of research which investigated how features of the organizational context in four retail food markets affected the learning and performance of their employees. One of the markets was a high performance workplace, in which principles that underlie new approaches to organizing and managing had been implemented successfully. The results suggest that it is feasible to implement a high performance, learning-oriented approach to organizing and managing in the low-wage service sector, but further research is needed to understand the conditions under which such systems can be successful.

In pursuit of higher performance and the ability to respond more rapidly to changing competitive conditions, many organizations are changing the way work is organized and people are managed. Although there are a variety of new approaches to organizing and managing, and an array of labels describing them—including high performance work systems and learning organizations—there is much convergence among them. Indeed, some have argued that there is a single deeper paradigm shift underlying many of the new approaches for successful organizing (Lawler, 1996).

The "new paradigm" is based on a set of ideas, a growing body of research findings, and accumulated learning from attempts to implement new systems, processes, and practices. Central to all of the approaches is the increasing recognition of the importance of human resources for performance and of the need for a comprehensive, integrated approach for successful organizational change and for sustained learning and performance.

A growing body of research has found that systems of interrelated and internally consistent work and human resource practices can have large, positive effects on diverse measures of organizational performance, including productivity, quality, innovation, cycle time, and customer satisfaction (Gephart, 1995; Kochan & Osterman, 1994). The strongest research evidence to date comes from the manufacturing sector, but there is growing evidence from case studies that similar principles can be successfully applied in services, government, and education.

There is considerable skepticism, however, about the efficacy of these new approaches in small business and in the low-wage service sector. The view is widespread that most small businesses cannot pursue a high performance, learning-oriented approach because they lack the time, staff and other resources needed or because they are too focused on short term survival to risk adopting practices that promise higher performance only in the longer term. Because these views are so prevalent, incentives have not been very successful in increasing the adoption of new approaches to organizing among small businesses or in the low-wage service sector in the U. S. economy.

Yet, because the new approaches to organizing offer the promise of committed, knowledgeable, and fulfilled employees, and of organizations that prosper, their successful implementation in the low-wage service sector might result in substantial benefits both for businesses and for their employees. It is commonplace for employers in that sector to decry the shortage of skilled workers, while their employees complain that their jobs are "dead end" and do not offer opportunities for individual or career development.

To date, we know very little about the feasibility of innovative work and human resource practices in the low-wage service sector. Studies are needed that can shed light on the crucial details of whether and how innovative practices and principles have been implemented successfully, and if so, how they operate and with what effects. Since many new jobs are created every month in the low-wage retail service sector, such research has potentially important

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implications for social action and policy. Research might conclude that the potential for success is indeed limited and the risks are great. Or, research might identify conditions for success, and stimulate the benchmarking and diffusion of best practices and role models. Given our interest in low-wage and relatively unskilled workers, we decided to begin this research with a study of retail food markets.

Theoretical Framework

Although there is no single agreed-upon definition of "the new paradigm" in organizing, nor any consensus about a fixed set of practices, there is considerable agreement about a core set of ideas and principles (Appelbaum & Batt, 1994; Gephart, 1995; Lawler, 1996). When the environment is changing rapidly, with more complex situations, products, and services, decision-makers at higher levels often lack the subtle knowledge that people who are closer to the problem have. Hence, people who are closer to the point of impact can make better decisions provided that work is organized so that they have the information and knowledge they need, they feel accountable, have the power and authority to act, and receive the feedback to assess the results of their decisions and take corrective action. In the "new paradigm," hierarchical control is replaced by commitment and self-regulation, enabling control to move to the point of impact. Information is widely shared. Authority to make decisions is distributed to wherever appropriate. Competence is widespread; people do multiple tasks as needed. Rewards are based on skills and accomplishments.

Organizations are viewed as sets of resources and competencies, and the focus shifts from structures, functions, and jobs to the processes through which products and services are created—processes to which people with different skills and disciplines must contribute. Only if an organization's systems are designed to support such processes, can the organization and its employees operate in a manner that produces superior performance.

A key principle in all of the new approaches to organizing is thus the need for effective internal alignment. Focusing control systems at the point of impact and organizing around lateral processes typically requires changing organizational and work structures, the way people are developed and managed, and an organization's information and communication systems.

People need to be viewed as resources whose knowledge and skill contribute to the organization's competencies and capabilities. Selection emphasizes finding people who fit the organization's skill needs and its learning environment, rather than people who fit specific job openings. Individuals selected need to develop the skills and knowledge that will enhance the organization's core competencies. Most learning occurs through work, and effective organizations create multiple opportunities for continuous learning. People are rewarded for performing well, but also for developing competencies and for teamwork.

These new principles of organizing enhance the ability of the organization, as a system, to learn (Gephart, Marsick, Van Buren, & Spiro, 1996). Learning processes are monitored, developed, managed, and aligned with improvement and innovation goals. Individuals and groups share their knowledge and learning with one another. Collective and organizational learning are facilitated by a culture that values and supports learning, collaboration, systems thinking, innovation, trust, openness and diversity; by leaders who create vision and model learning; by organizational structures and systems that remove barriers to learning and change, foster systems thinking and learning, cooperation and interdependence, as well as enable the capturing, sharing, and dissemination of practical new knowledge.

Research Questions

Drawing on these ideas, this study investigated the feasibility and operation of the following "new paradigm" principles of organizing in retail food markets:

- the philosophy that competitive advantage can be achieved through the strategic use of people
- the principle that work structures and processes are organized to maximize customer responsiveness and organizational learning
- human resource policies and practices—from selection and training, to compensation and career development—that seek to build employees' motivation, skill, and flexibility, and to align individual interests with those of the organization
- new approaches to leading and managing that are consistent with these philosophies, ways of organizing work, policies and practices

This study investigated whether these principles can be successfully implemented in retail food markets and how features of the organizational context in such settings affect the learning and performance of workers.

Methodology

The study employed a matched case study design. From an initial pool of eight retail food markets, we selected four (two matched pairs) that would enable us to compare the organizational features and management practices of markets which differed in the levels of their employees' performance, as assessed by customers, but were similar in their size, products, customers, and employee demographics.

Two of the markets selected were small retail food markets--fruit and vegetable markets that also carried a variety of specialty items such as cheese, smoked fish, coffee beans, etc. The other two were supermarkets, each of which was part of a larger chain. All four markets had diverse workforces and were located within a 10 block radius in a large Northeastern city. Customers who were interviewed in the initial phase of the research indicated that they frequently shopped in two or more of the four stores.

The research was undertaken in three phases, during the period from 1995 to 1997. In the first phase, researchers, in the role of participant-observer customers, visited each of the markets at a variety of different times of the day and days of the week. During those visits, they interviewed customers and observed the behavior of employees and managers. In the second phase, researchers interviewed employees; in the final phase, the senior researcher interviewed store managers.

The four markets were ranked according to their employees' performance overall, as assessed by customers who indicated how knowledgeable, responsive, and helpful [*very, somewhat, not very*] they found the employees in that store. When customers said that they shopped in more than one of the markets, they were asked to compare the performance of employees in the other markets with which they were familiar.

On the basis of this information, we were able to differentiate three levels of employee performance. Employees in one of the small markets were consistently rated very knowledgeable, responsive, and helpful. We rated that market "high" on employee performance and ranked it at the top of the group. Employees in the other small market and in one of the supermarkets received mixed, but overall positive ratings. We rated those two markets "medium" and ranked them in the middle of the group. Employees in the second supermarket received mixed, but generally negative ratings. We rated that market "low" and ranked it last.

Next, we investigated the extent to which, in each of the markets, (1) employees were viewed as competitive assets; (2) work structures and processes were organized to enhance customer responsiveness and organizational learning (3) employees were motivated and committed to the organization's goals; (4) employees were knowledgeable, skilled, and flexible; and (5) approaches to leading and managing were consistent with and supported these values and principles. We relied on a mix of direct observations and interviews with customers, managers, and employees for our data.

Results

The small market (market # 1) whose customers rated the employees' performance highly had many of the core characteristics that have come to be associated with high performance work system (Applebaum & Batt, 1994; Lawler, 1996) and learning organization (Gephart, Marsick & Van Buren, 1997; Watkins & Marsick, 1996) models. It was a fast-paced, very successful small market. High expectations and standards were shared by employees and managers. Employees had considerable autonomy and felt personal responsibility for satisfying customers, for their own performance, and for maintaining the reputation of the market. Employees' eagerness to learn was in the service of these goals. The culture supported cooperation and continuous learning. In contrast, the low performance supermarket (market # 4) was a classic control-oriented organization, characterized by autocratic management, destructive ethnic and racial conflict, and employee behavior that ranged from apathy to sabotage. The two medium performance markets represented more mixed cases. The medium performance small market (market # 3) had little competition in its immediate area, and the managers and workers had a relaxed attitude about performance standards. The medium performance supermarket (market # 4) was a cohesive and collegial workplace. But it was a store whose inventory of core products was irregular, and employees feared (correctly) that their branch of the chain had been slated for closing. Employees and managers were friendly and helpful to customers, but motivation and expectations for learning and performance were not high.

People as Competitive Assets We assessed the extent to which employees were viewed as competitive assets through observations and interviews with customers, employees and managers. Two scenes that were observed in all of the markets—customers requesting information and customers questioning prices—were revealing of the extent to which the philosophy that employees are competitive assets was the prevailing view in each market.

In market # 1, when customers requested information—usually about products, prices, or appropriate cooking techniques—the nearest employee was frequently able to provide the information requested. If not, he or she asked another employee, who nearly always knew the answer. Customers rarely questioned prices. The prices of cheese, deli, coffee, and other specialty items were marked by the employees who prepared them for the customers, and either prices or product codes were entered manually in point of sale registers by the checkers. The store did not use bar codes to scan prices, because, we were told, "that would lead to errors and delays. The checkers do better manually." In the interviews, employees and managers confirmed what researchers observed—that the performance and success of the market depended on the employees. A variety of well-priced, products of the highest quality were considered to be the necessary, but not sufficient conditions for competitive success. We were told that customers were always in a hurry and expected quick service without mistakes.

In the other small market (market # 2), neither the employees nor their managers viewed them as competitive assets. When customers requested information, employees frequently seemed confused. Often, they did not know the names or prices of products, and many customers had learned to ask the managers directly. When prices were questioned by customers, the checkers nearly always consulted the manager, who resolved any disputes with the customer.

In the medium performance supermarket (market # 3), although the employees and their managers thought the store's employees were an important asset, none of them believed that they could affect the things that mattered most to customers or to the future of the market. Employees were usually able to provide information requested by customers, and to resolve price questions easily. Managers were ready to provide help if needed.

In the low performance supermarket (market # 4), neither employees nor their managers believed that employees were a competitive asset. Customers rarely asked for information or challenged mistakes in prices. In response to our queries about price questions, one customer commented (and others nearby agreed): "The checkers are so hostile, it practically ruins your

day to come in here. When they make mistakes I usually just let it go. It's not worth the hassle trying to do anything about it."

Work Structures and Processes Organized to Enhance Customer Responsiveness and Organizational Learning In each market, we observed work processes to assess whether and how they enhanced or impeded the markets' ability to respond to customer needs, wants, and complaints, and to incorporate feedback from customer behavior and views. We also asked employees and managers whether they could tell us what aspects of their products and services were valued and disliked most by their customers, and whether and how they kept abreast of customers' changing preferences. We compared their answers with the information obtained from their customers.

The high performance market (market # 1) had a very high volume of customers. Work processes were smooth and well organized; roles and responsibilities seemed clear, but flexible. Work processes, roles, and responsibilities were all focused on meeting the customers' needs. Lines at the check-out counters were often long, but they moved quickly. Customers told us they rarely waited more than five minutes to be served at a counter or to check out. Managers spent most of their time providing back-up support for employees—bagging at the checkout counters and removing carts and baskets as soon as customers had finished with them. Customers' major sources of frustration were the stress of shopping in such a crowded store and the rudeness of other customers. Employees who stocked shelves provided feedback about inventory levels, and changing customer preferences were discussed at employee meetings. Employees at the deli and cheese counters described new products to customers, offered free tastes, and monitored their likes and dislikes, as well as the volume and quantities of different products sold. It was not unusual for a group of customers to be gathered at the cheese counter discussing new cheeses and providing advice to each other, with occasional input from the well-informed employees. Employees and managers in this high performance market understood what their customers valued and disliked. Customers expected a variety of fresh, high quality products, at fair prices. Customers had come to expect nearly flawless service, and the occasional delays and confusion were met with surprise and impatience. Managers told us that employees often provided valuable suggestions about new products that customers wanted. The market has recently expanded, providing fresh fish, and more canned and prepared foods, in response to their customers' wishes for one-stop shopping, here, not elsewhere.

The volume of customers was much lower in the other small market (market # 2). Customers' views of this market were that they paid fairly high prices for a wide variety of products of mixed quality. Service was less efficient than in market # 1, and there were more delays and bottlenecks at the checkout counters. Customers' expectations were lower, however, and there were usually enough employees working to prevent lengthy delays. Customers considered the market's convenient location to be its main advantage. When they wanted superior products, they were likely to travel the extra half-mile to market # 1. As a place to stop for a few things on the way home from work, market # 2 met their needs. Employees and managers seemed surprised when we asked them if they knew what their customers valued and disliked about their products and services. Employees thought that the main problem for customers was that things were not well organized. Managers were aware of the products carried by competitor stores, but not of their customers' likes and dislikes.

In the medium performance supermarket (market # 3), the volume of customers was very low. The erratic supply of many products led customers to shop elsewhere, unless they were passing by and needed something. Employees and managers were as helpful as they could be to customers, but felt that they had no power to meet real customer needs. They thought that the store's moderate prices and their helpful and friendly attitudes were the market's main attractions to its customers. The customers whom we interviewed agreed. Work processes, roles, and responsibilities were formally and narrowly defined in this market, and there were lots of rules on the books, but most things were handled flexibly, with the support and encouragement of the managers.

In the low performance supermarket (market # 4), customers ranked many products high on quality and variety, but many customers said they shopped here as a last resort because the

employees were "so hostile," and the prices were "through the roof". Customers reported that the checkers were slow, unfriendly, and certainly didn't care about customers. Checkers often left their registers to get change, and waited for the managers to appear to ask for price checks. When we asked employees if they knew what customers valued or disliked about the store's products and services, they returned incredulous glances. The managers recognized that the store didn't have enough business because of its pricing structure.

Employee Motivation and Commitment We assessed the extent to which employees were motivated and committed by observing their behavior and by interviewing them and their managers. Employees in the high performance market seemed actively and positively engaged in their work, although they complained that work was very stressful when the store was crowded with impatient customers. Most employees considered this market to be the best place they had ever worked, and many saw the opportunity to work in here as a critical step in their careers. Some said that when they left, they would be able "to write their own ticket." Previous employees were reported to be managing departments in other markets. When asked about their wages, some employees complained about the high taxes they had to pay. Employees were aware that the market provided critical opportunities for their learning and development, but they also thought the market was lucky to have them as employees. They worked hard, and felt that they played a critical role in sustaining the success and reputation of the market.

Employees in the medium performance small market were satisfied with their jobs—but for many, they were just jobs. Few had thought about the next steps in their careers, although some mentioned that there were other markets in their group where they could apply to work if they wanted to. Employees seemed motivated to be helpful to customers, but they did not see any need to learn more about products (that was the managers' responsibility), and they did not experience any pressure for higher performance.

Most of the employees in the medium performance supermarket had worked there for a long time. They enjoyed working with each other and liked their managers, but they would have preferred working where there were more opportunities for advancement. Employees were concerned about the quality of their own work, but felt that they did not have any challenging goals to work toward, and were somewhat disengaged as a result.

Most of the employees in the low performance supermarket were very disaffected. Employees who worked at the deli counter delighted in giving things away to customers, or charging less than the store price. The checkers, all of whom were females, seemed perpetually angry. They claimed that they were not paid as well as the men who worked in the store, although their work was more difficult. They told us that because the store was very cold, they needed to work in jackets. They claimed that the managers were always trying "to catch them at something." The employees, who were mostly African American and Puerto Rican, agreed that the managers, who were Caucasian, did not treat them with respect. Most employees believed that working in this supermarket was a dead end, and some said they were looking for another job.

Employee Knowledge, Skill, and Flexibility We assessed the extent to which employees were knowledgeable, skilled, and flexible by asking customers about their experiences, by asking managers for their assessments, and by observing employees directly, as they interacted with customers and with each other. Employees in the high performance market were very knowledgeable, skilled, and flexible. Those working in specialty foods—such as cheese, coffee, or the deli counter, had mastery knowledge of all the products and prices in their areas. Most other employees had specialized knowledge and skills as well, but many were trained in several areas and were thus able to fill in for co-workers. Employees throughout the store prided themselves on being able to answer any customer's questions.

In the medium performance small market, employees varied in their knowledge and skills. A few had been "eager to learn" and had taken advantage of all opportunities, while others were content to "get through their shift." Employees had fixed job definitions, and managers did not expect them to have extensive knowledge of products. So, there were few incentives or rewards for acquiring additional skills or knowledge, and few opportunities to learn new skills on the job.

Many employees in the medium performance supermarket were knowledgeable about the market's products and prices. There was a culture of cooperation and mutual support in the market, and employees were responsive and helpful to customers, but there were no incentives for acquiring more knowledge or skills. Despite fixed job descriptions, managers and employees were quite flexible in their day-to-day behavior.

In the low performance supermarket, most employees were not very knowledgeable or skilled. Those who worked at the deli and fish counters were exceptions, but because there were so few customers who purchased from those counters, there were few opportunities for them to use their knowledge or skills. The market used bar code price scanning for many products, but checker errors were still common. Formal job descriptions were fixed and narrowly defined, and managers did not encourage flexibility.

Approaches to Leading and Managing We assessed approaches to leading and managing by asking managers in each of the markets about their philosophies of managing, by asking employees and managers how work was monitored and supervised, and by observing interactions between managers and employees, and among employees.

Managers in the high performance market believed that the only way to satisfy their many, demanding customers was to hire good employees, train them well, rely on them and support them to make their work as easy as possible. The managers worked hard to make sure that correct prices were displayed for products and that price lists were up to date. From their perspective, it was not difficult to find good employees. New employees were frequently referred by current workers. The managers, and the owners, with whom we spoke, believed that most employees were eager to work in a stimulating environment and learn about the growing and competitive specialty retail food business. When asked about supervision and monitoring, managers and employees agreed that employees monitored each other. There was very little obvious hierarchy. Unless you knew who the managers were, you were likely to mistake them for regular employees.

Managers in the medium performance small market were often at the front of the store, ready to provide assistance or solve problems. When checkout lines became too long, they opened additional lines themselves. They told us that when the store first opened, it was difficult to find good employees. Even now, with a stable group of employees, they said ,"it's a lot to manage. Employees need a lot of direction and supervision. There is never enough time to keep price lists up to date...And we have a lot of problems to solve with unreliable suppliers."

Managers in the medium performance supermarket told us that their employees were easy to manage. Most of them had worked in the store for a long time, and they were competent and responsible. Managers reported that their greatest concern was that they were not able to influence the things that would attract more customers—the quality or steady supply of products. So, "we do what we can and hope for better days."

The managers in the low performance market reported that it was virtually impossible to find reliable workers. So, we were told, "they must be supervised very closely." Most days, the day-shift manager paced back and forth behind the checkers, smoking cigarettes with the "no smoking" signs prominently displayed nearby. He seemed angry that we were taking up his time asking questions. There was a lot of tension in the air, and our researchers did not enjoy being in the store.

Conclusions

The results of this research demonstrate that the principles underlying "new paradigm" approaches to organizing can be implemented successfully in a retail food market in the low-wage service sector. The results also help us to understand how features of the organizational context in the high performance market facilitated the learning and performance of its employees, and what were the consequences of the absence of those features in other markets.

Several characteristics of high performance market that were not analyzed in this paper, but affected its success, were unique to it. A steady supply of high quality products at fair prices

was critical to the market's success. The market's produce came from its own farms, and two of the three owner-partners spent most of their time identifying high quality suppliers for other products. In addition, the partners who owned the market owned rather than rented the space in which the market was located. They had purchased the building at a time when property values were much lower than at the time of this study. Managers in one of the other markets reported problems with their suppliers, and all of the other markets paid high rents for their spaces. These characteristics underscore an issue that has been raised repeatedly in the literature on high performance work systems, namely, whether the feasibility of such systems depends on a certain level of competitive success and financial performance.

Additional research is needed to assess the extent to which high performance, learning-oriented workplaces exist in the low-wage retail service sector, and to develop a comparative profile of their characteristics. Additional research is also needed to understand the conditions under which such a system can be developed in other food markets or other kinds of establishments in the low-wage retail service sector.

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Development and Validation of a Generalized Learning Transfer Climate Questionnaire: Final Report

Elwood F. Holton III
Reid A. Bates
Louisiana State University

Wendy E. A. Ruona
University of Minnesota

Michael Leimbach
Wilson Learning Corporation

This study provides a final report on construct validation through common factor analysis of an expanded learning transfer climate instrument. Building on our earlier work, a third generation instrument was developed measuring 16 hypothesized constructs. The Learning Transfer Questionnaire (LTQ) was administered to 1616 employees from a wide range on organizations undergoing an assortment of training. Findings supported the hypothesized structure. The instrument development process, factor structure, and future research agenda are described.

Investment in training activities aimed at improving employees' job performance represents a huge financial expenditure in the United States. In 1997 organizations with more than 100 employees were estimated to have spent $58.6 billion in direct costs on formal training (Lakewood Research, 1997). With the inclusion of indirect costs, informal on-the-job training, and costs incurred by smaller organizations total training expenditures could easily reach $200 billion or more annually. Of this expenditure, as little as 10% is projected to pay off in performance improvements resulting from the transfer of learned knowledge, skills, and abilities to the job (Baldwin & Ford, 1988). Although the exact amount of transfer is unknown, the transfer problem is believed to be so pervasive that there is rarely a learning-performance situation in which such a problem does not exist (Broad & Newstrom, 1992).

Transfer of training can be defined as the degree to which trainees apply knowledge, skills, behaviors, and attitudes learned in training to their jobs. Transfer of training is traditionally seen as a function of three sets of factors: trainee characteristics, including ability, personality and motivation; training design, including a strong transfer design and appropriate content; and the work environment, including support and opportunity to use (Baldwin & Ford, 1988). Although a good deal of research has been done on design factors (Noe, 1986), significantly less has been done to understand how work environment factors influence transfer of training (Baldwin & Ford, 1988; Tannenbaum & Yukl, 1992).

One conceptualization of the manner in which work environment factors affect the transfer of learning to the job is through a transfer of training climate. Transfer climate is seen as a mediating variable in the relationship between the organizational context and an individual's job attitudes and work behavior. Thus, even when learning occurs in training, the transfer climate may either support or inhibit application of learning on the job (Mathieu, Tannenbaum, & Salas, 1992). Several studies have established that transfer climate can significantly affect an individual's ability and motivation to transfer learning to job performance (Huczynski & Lewis, 1980; Rouiller & Goldstein, 1993; Tracey, Tannenbaum, & Kavanaugh, 1995; Xiao, 1996). Although many authors support the

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importance of transfer climate, some stating it may even be as important as training itself (Rouiller & Goldstein, 1993), there is still not a clear understanding about what constitutes an organizational transfer climate (Tannenbaum & Yukl, 1992).

These findings point to the need to carefully consider how transfer climate is operationalized and how it can be measured validly and reliably. In recent transfer climate research, a wide variety of instruments have been used with measures ranging from single item scales used to quantify constructs, to multiple item, content validated but situation specific scales. This raises several concerns. First, the tendency toward custom designed scales for each study makes generalization of findings across studies questionable and conclusions about the latent construct structure of transfer climate difficult. Second, these studies often do not include factor analyses to validate hypothesized constructs. Third, some of the scales, particularly single item measures, have questionable psychometric qualities. Not surprisingly, different studies have produced a variety of conclusions about the relationship between transfer climate and performance, perhaps because of instrumentation differences. In a recent review, Ford & Weissbein (1997) report little progress in this arena.

What is needed, and should be an important research goal for HRD research, is the development of a valid and generalizable set of transfer climate scales. An established set of transfer climate scales with validated constructs and known psychometric qualities would facilitate valid cross-study comparisons and add significantly to our understanding of the transfer process. In addition, it would facilitate transfer research by reducing or eliminating the need for redundant instrument design.

Development of a general transfer climate instrument would not preclude the addition of situation specific scales. Rather, it would provide a foundation of validated constructs with established applicability across populations and settings. Research in organizational behavior, which produced a series of tested and generally accepted job attitude scales, provides a strong example of the value of such a goal.

From a broader perspective, defining and accurately measuring transfer of training climate is important because it helps HRD move beyond the question of whether training works to why training works (Tannenbaum & Yukl, 1992). For example, without controlling for the influence of transfer climate, evaluation results are likely to vary considerably and yield erroneous conclusions about the causes of intervention outcomes (Holton, 1996). A valid and reliable measure of transfer climate also has significant diagnostic potential: it can be used to identify when an organization is ready for a training intervention and can provide information to guide pretraining interventions aimed at increasing training effectiveness. From a theoretical perspective, identifying and measuring dimensions of the work context that impact use of learned skills and behaviors provides a more complete conceptual framework of training effectiveness.

The purpose of this research was to move toward the goal of a general transfer climate instrument. Earlier research (Holton, Bates, Seyler, & Carvalho, 1997a, 1997b), reported on an attempt to validate the transfer climate constructs and instrument proposed by Rouiller and Goldstein (1993). Significant differences were found in construct structure that led to the conclusion that Rouiller and Goldstein's constructs should not be the basis for a generalized instrument. The Holton et al. study factor analyzed an expanded transfer climate instrument incorporating several unexplored constructs. The nine factor solution that emerged indicated the presence of additional climate constructs and indicated that transfer climate was perceived according to organizational referent.

Holton, Bates & Leimbach (1997) reported on initial construct validation of an expanded learning transfer instrument building on (Holton et al., 1997a). Based on exploratory factor analysis from 320 respondents, they reported initial evidence of the Learning Transfer Questionnaire's viability. In addition, their preliminary report suggested a set of clean, interpretable transfer constructs could be identified and scales constructed to measure them.

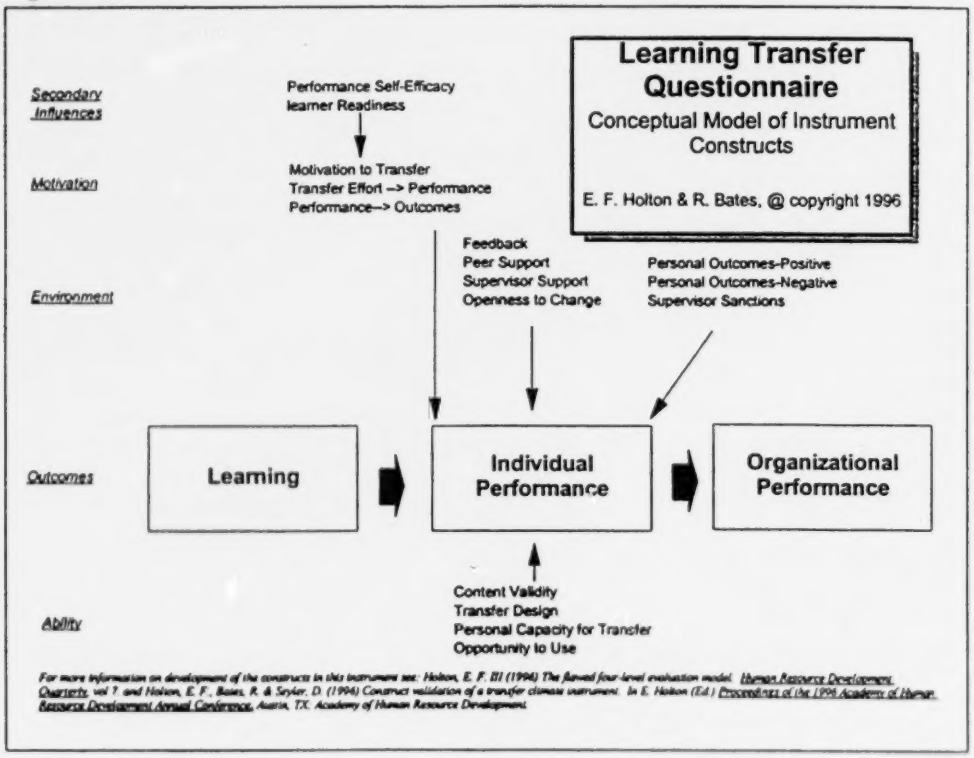
This study continues this stream of research. The Learning Transfer Questionnaire used here is identical to the one used in the preliminary report (Holton, et al., 1997). It includes what are believed to be a comprehensive set of constructs affecting the potential for training to transfer to the job. As shown in Figure 1 below, Holton's (1996) proposed evaluation model was used as a

conceptual base for the LTQ and was the model upon which the two studies cited above were based.

The primary purpose of this paper is to provide a final report on construct validation of the LTQ using factor analysis. More specifically, it addressed the following research question:

> *Research question*: Will exploratory factor analysis of the Learning Transfer Questionnaire (LTQ) result in an interpretable factor structure of latent transfer climate constructs?

Figure 1


Learning Transfer Questionnaire
Conceptual Model of Instrument Constructs
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Secondary Influences
Performance Self-Efficacy
learner Readiness
Motivation
Motivation to Transfer
Transfer Effort --> Performance
Performance--> Outcomes
Environment
Feedback
Peer Support
Supervisor Support
Openness to Change
Personal Outcomes-Positive
Personal Outcomes-Negative
Supervisor Sanctions
Outcomes
Learning
Individual Performance
Organizational Performance
Ability
Content Validity
Transfer Design
Personal Capacity for Transfer
Opportunity to Use
For more information on development of the constructs in this instrument see: Holton, E. F. III (1996) The flawed four-level evaluation model. Human Resource Development Quarterly, vol 7. and Holton, E. F., Bates, R. & Seyler, D. (1994) Construct validation of a transfer climate instrument. In E. Holton (Ed.) Proceedings of the 1994 Academy of Human Resource Development Annual Conference, Austin, TX. Academy of Human Resource Development.

Method

Instrument Development A pool of 112 items was generated to represent 16 hypothesized constructs. We began with the 64-item instrument that emerged from our previous work (Holton et al., 1997a) which had its beginning with the Rouiller and Goldstein (1993) instrument. This instrument had shown initial evidence of content, construct and criterion validity (Bates, Holton, & Seyler, 1997; Seyler, Holton, Bates & Carvalho, in press).

Because the instrument that emerged had a disproportionate numbers of items across constructs (e.g. 23 items measuring supervisor support), we first reduced the number of items by selecting only the highest loading items from its large scales. Next, we examined the literature to identify other constructs that had not previously been measured. Important additions included constructs such as performance self-efficacy, expectancy related constructs (transfer effort-performance and performance-outcomes), personal capacity for transfer, feedback/performance coaching, and general motivation to transfer. We then fit these constructs into the theoretical framework of the HRD Research and Evaluation Model (Holton 1996) as shown in Figure 1.

The items were divided into two sections. For the first section, containing 76 items representing 11 constructs, trainees were asked to consider the specific training program they were

attending. The instructions for this section were to "think about this specific training program." Another 36 items, representing 5 constructs, were placed in the second section. Trainees were instructed to "think about training in general in your organization." Constructs in the second section included transfer effort-performance, performance-outcomes, openness to change, performance self-efficacy, and feedback/performance coaching.

Sample The LTQ was administered to 1,616 people in a wide variety of organizations and training programs (see Table 1). Because the purpose of this research program was to develop a generalized instrument that can be used across a wide range of training programs and organizations, the sample had been deliberately chosen to be as heterogeneous as possible. It includes respondents from a variety of industries including shipping, power, computer/precision manufacturing, insurance, chemical, industrial tool/construction, non-profits, and municipal and state governments. The municipal and state government classes were offered by a central training organization, so the classes included representatives from a wide variety of agencies and functions. A wide range of employees attended various training programs. These included secretaries, manufacturing operators, technicians, and engineers, managers, professionals, sales people, and law enforcement personnel. The training programs covered a wide variety of topics including sales, safety, volunteer management, project management, computer and technical skills, quality science, emergency medicine education, and various classes related to leadership, mid-management, and supervision.

Table 1- Selected demographics

Organization Type	*n*	%%	Training Type	*n*	%%
Government	676	41.8	Technical Skills	544	33.7
State (175)			Sales/Cust Serv	434	26.9
Local (501)			Volunteer Mgt.	192	11.9
For Profit Organization	432	26.7	Leadership/Mgt.	175	10.8
Non-profit Organization	192	11.9	Professional Skills	80	5.0
Public Training Classes (mostly for-profit)	316	19.6	Supervisory Skills	67	4.1
			Clerical	62	3.8
			Communication	44	2.7
			Computer	18	1.1
TOTAL	1616		TOTAL	1616	

Analysis. A central question for researchers developing instruments is whether to use exploratory (EFA) or confirmatory factor analysis (CFA) with structural equation modeling. Unfortunately, there are no generally accepted decision rules and there is continuing discussion about appropriate use of the two methods (Crowley & Fan, 1997; Holloway, 1995; Hurley, et al., 1997). Generally, CFA is driven by specification of a theoretically grounded structure of hypothesized latent variables and indicators. As such, it requires the presence of strong theory. EFA, on the other hand, makes no such presumption, even though items may have been derived from some conceptual framework. In its purest form, EFA makes no assumptions about the number of factors. In practice, CFA becomes exploratory when models are respecified, and EFA is used to confirm loosely constructed models underlying data. Anderson and Gerbing (1988) suggest that the two might be better viewed as an ordered progression. Bentler and Chou (1987) take a stronger position, suggesting that the measurement model in CFA should be based on well-known, exploratory factor analysis.

EFA was determined to be the best method at this stage from several perspectives. From a theoretical perspective, no strong theory exists in the general transfer literature. In addition, the specific model that guided instrument development had not been tested. From a statistical perspective, the following reasons also support the use of EFA at this stage:

1. EFA is considered more appropriate in early stages of scale development because CFA does not show cross-loadings on other factors (Kelloway, 1995).

2. EFA may be more appropriate for scale development (Hurley et al, 1997).
3. EFA provides a more direct picture of dimensionality (Hurley, et al., 1997).
4. The use of modification indices to alter models is an exploratory use of CFA and is not without controversy (Anderson & Gerbing, 1988) and may not be appropriate (Williams, 1995).
5. The use of maximum liklihood estimates for exploratory analysis is likely to result in biased parameter estimates (Brannick, 1995)

The EFA approach used here was common factor analysis because it is more appropriate than principal components analysis when the objective of the analysis is to identify latent structures, rather than for predictive purposes (Nunnally & Bernstein, 1994). An oblique rotation was used because it is also more appropriate for latent variable investigation when latent variables are expected to have some correlation.

Construct validation has traditionally consisted of establishing convergent and divergent validity with other constructs through correlational studies. More recently, factor analysis has been recognized as "a powerful and indispensable method of construct validation (Kerlinger, 1986, p. 427)" that "is at the heart of the measurement of psychological constructs" (Nunnally & Bernstein, 1994, p.111). The combination of common factor analysis with convergent and divergent validity studies results in a more complete construct validation.

The items in the two sections of the instrument represented two distinct construct domains: specific transfer climate and general transfer climate. They were therefore factor analyzed separately with 76 items pertaining to the specific training program in one pool, and 36 items pertaining to general transfer climate in the second pool.

The large sample (1616) resulted in a respondent to item ratio of 21.3:1 for specific training items, and 44.9:1 for general climate items. Generally a ratio of between 5:1 to 10:1 is desirable (Hair, Anderson, Tatham, & Black, 1995). This sample would therefore be considered to have strong respondent to item ratios.

Results

EFA resulted in an exceptionally clean and interpretable sixteen factor structure that closely mirrored that of the hypothesized factors (see Table 2). The average loading on the major factor was .62 with only a .05 average loading on non-major factors. Cronbach alpha reliabilities ranged from .63 to .91, with only three of the scales below .70 (α = .63, .68, & .69). One scale, supervisor sanctions, was substantially below the .70 minimum recommended by Nunnally & Bernstein (1994) for early stage instruments. Definitions for each factor are also shown in Table 2.

As might be expected from an early stage instrument, a number of items did not load on any factor, others loaded weakly, and some loaded on different factors than hypothesized. This confirms the importance of using EFA in early stages of instrument development. While the hypothesized factor structure was ultimately supported, significant modification to the measurement model was necessary. CFA also could have missed the items that loaded on different factors. Table 3 shows the interfactor correlations. Only a few correlations exceeded .30, further emphasizing the conceptual distinction between the factors.

Discussion/Implications

As HRD shifts toward performance management, measurement of transfer climate will become more important. Validation studies such as this are important to develop standard instruments to measure climate across multiple organizations and intervention types. With psychometrically strong instrumentation, HRD will be in a position to provide more definitive answers to questions about the nature of training transfer and about barriers and enablers to transfer in the work environment.

Table 2 – LTQ Factors,

FACTOR	DEFINITION	NUM ITEMS	α	AVG LOAD-MAJOR FACTOR	AVG LOAD-MINOR FACTOR
SPECIFIC SCALES					
Learner Readiness	The extent to which individuals are prepared to enter and participate in training	4	.73	.64	.04
Motivation to Transfer	The direction, intensity, and persistence of effort toward utilizing in a work setting skills and knowledge learned.	4	.83	.65	.04
Positive Personal Outcomes	The degree to which applying training on the job leads to outcomes that are positive for the individual.	3	.69	.56	.05
Negative Personal Outcomes	The extent to which individuals believe that applying skills and knowledge learned in training will lead to outcomes that are negative.	4	.76	.65	.04
Personal Capacity for Transfer	The extent to which individuals have the time, energy and mental space in their work lives to make changed required to transfer learning to the job.	4	.68	.56	.04
Peer Support	The extent to which peers reinforce and support use of learning on the job.	4	.83	.66	.04
Supervisor Support	The extent to which supervisors/managers support and reinforce use of training on the job.	6	.91	.75	.04
Supervisor Sanctions	The extent to which individuals perceive negative responses from supervisors/managers when applying skills learned in training.	3	.63	.46	.06
Perceived Content Validity	The extents to which trainees judge training content to accurately reflect job requirements.	5	.84	.58	.05
Transfer Design	The degree to which 1) training has been designed and delivered to give trainees the ability to transfer learning to the job, and 2) training instructions match job requirements.	4	.85	.70	.03
Opportunity to Use	The extent to which trainees are provided with or obtain resources and tasks on the job enabling them to use training on the job.	4	.70	.54	.06
GENERAL SCALES					
Transfer Effort–Performance Expectations	The expectation that effort devoted to transferring learning will lead to changes in job performance.	4	.81	.65	.05
Performance-Outcomes Expectations	The expectation that changes in job performance will lead to valued outcomes.	5	.83	.65	.06
Resistance/Openness to Change	The extent to which prevailing group norms are perceived by individuals to resist or discourage the use of skills and knowledge acquired in training.	6	.85	.70	.04
Performance Self-Efficacy	An individual's general belief that they are able to change their performance when they want to.	4	.76	.58	.08
Fdbk/Performance Coaching	Formal and informal indicators from an organization about an individual's job performance.	4	.70	.56	.08

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Table 3 - Inter-factor Correlations

Specific Scales	1	2	3	4	5	6	7	8	9	10	11
1-Learner Readi	1.00										
2-Mot to Trans	.15										
3-P O Pos	-.05	-.25									
4-P O Neg	-.16	.05	.20								
5-Pers Capacity	.22	.26	.00	-.06							
6-Peer Support	.25	.28	-.03	-.17	.25						
7-Sup Support	-.17	-.17	.28	.19	-.24	-.31					
8-SupSanctions	.11	-.05	.12	.04	.14	.21	-.20				
9-Content Valid	-.30	-.33	-.02	.12	-.30	-.30	.24	-.10			
10-Transfer Desgn	.19	.43	-.02	.05	.22	.31	-.11	.00	-.48		
11-Opp to Use	-.14	-.22	-.02	-.10	-.40	-.25	.15	-.26	.29	-.31	

General Scales	12	13	14	15	16
12-Transfer Effort Perf Expect	1.00				
13-Perf Outcome Expect	.41				
14-Res/open Change	-.15	-.37			
15-Perf Self Efficacy	-.24	-.14	.28		
16-Fdbk/Perf Coaching	.34	.47	-.31	-.15	

Without strong instrumentation, researchers will be limited in their ability to arrive at general conclusions and prescriptions about transfer climate because there will always be a question as to the extent to which measurement error contributes to the findings.

This instrument is the only one known to the authors that has received this type of construct validation. Exploratory factor analysis revealed a clean interpretable factor structure. One strength of this analysis is that it is based on a very large and extremely diverse sample. This provides a high level of confidence that the instrument will work well across most types of training and in most organizations. Of course factor analysis only provides a measure of construct validation for the instrument. Criterion validation studies as well as convergent and divergent validation are needed to further refine the instrument. The authors are also testing new items to strengthen the reliabilities of certain scales.

This study has firmly established that an instrument to measure transfer climate factors can be developed with rigorous psychometric procedures. It is incumbent upon transfer researchers to stop using weak, unvalidated measures of transfer climate in order to advance the theory of training transfer. With such an understanding, practitioners can turn their attention to managing transfer conditions in organizations to enhance performance outcomes of training.

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